Richard A. Wallace, left, "brainstorms" with associates the PLANALOG projection of the plan and schedule for the design engineering phase of computer peripheral equipment at Bridge, Inc., a subsidiary of Control Data Corporation.

25 PERCENT SAVING IN PROJECT TIME ATTRIBUTED TO UNIQUE PLANNING METHOD

A simplified planning method that channels complex activities into measurable units resulted in a 25 per cent savings in project time, said R. A. Wallace, former Director of Engineering of Bridge, Inc., a subsidiary of Control Data Corporation. The new method of planning is a development of Planalog, Inc., of Philadelphia. Bridge, Inc. specializes in the design, development and manufacturing of card punching and reading systems, and peripheral devices for computers.

"The planning instrument called a Planalog is like a scratch pad memory to engineers that use it," said Mr. Wallace. "Other methods like bar charts and PERT (Program Evaluation Review Techniques) were either too vague or too cumbersome for our engineers to work with directly in terms of time and understanding. Not until we began to use the Planalog method of project scheduling were our engineers able to evaluate their project schedules quickly and in detail, and efficiently modify their planning when necessary," he said. The new method of planning is a development of Planalog Inc., Philadelphia, Pa.

According to Mr. Wallace, previous methods such as bar charts and manpower charts were slow and imprecise, and did not invite an engineer to resolve a plan involving time, tasks, and critical resources. The Planalog very effectively improved his department's ability to make accurate engineering project time and task schedules. The ability to see an entire picture of the time and task relationship on the Planalog enabled his engineers to check their project's daily progress, and to rapidly and effectively make modifications as required.

The Planalog system has many advantages according to Mr. Wallace. Citing several he said, "The Planalog:

. Invites the engineer to plan his project in great detail.
. Indicates critical paths without calculations.
. Is easy to modify as a design project evolves.
. Reflects technical progress or lack thereof in terms of tasks and time.
. Provides a simplified, rectilinear method of presenting project planning information.
. Simulates the effects of any proposed or actual project change.
. Provides a basis for real time program cost control and cost accumulation."

TO THE POINT
FROM THE PHILADELPHIA REFINERY
THE ATLANTIC REFINING COMPANY

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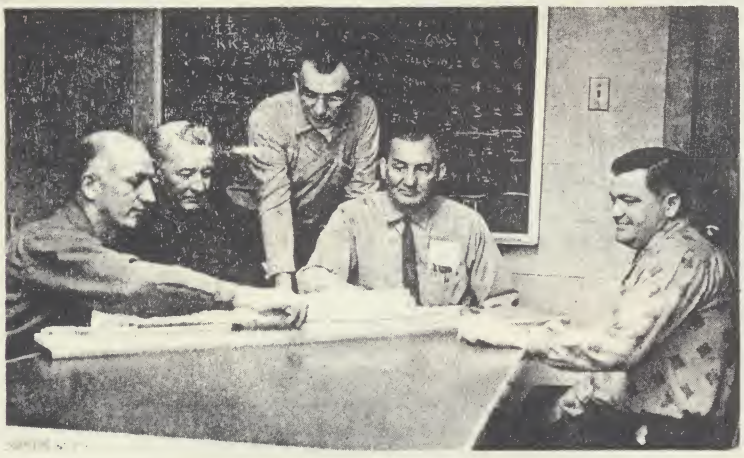

AT WORK on the Scheduling Management Display module, the "brainstormers" for the #853 Unit project were (from left) Ed Siccardi, mechanical engineer and coordinator, Refining Section; and George Zimmer, No. 3 Zone foreman; Harry Richardson, shutdown engineer; Wallace Bullwinkle, authorization zone foreman, and John Gault, planning engineer; all of the Mechanical Section.

Advance Planning Proves Value in No. 853 Shutdown

Most Philadelphia Refinery employees realize that some unit shutdowns are relatively minor operations in that the unit is offstream for a relatively short period of time and that comparatively few men are required to make the necessary repairs to return the unit to top operating condition. Other shutdowns are major operations requiring a longer period of time and a great many men to get the job done as quickly and efficiently as possible.

But, whether they are considered major or minor operations, all shutdowns have one thing in common — they must be well-planned before the actual shutdown gets underway. Of course, the bigger the job, the more complex the planning becomes.

Most refinery employees are aware of some of the efforts Atlantic is making in order to increase the efficiency of its over-all operation from personal contact with capital expenditure programs here at the refinery. Few, however, are aware of the fact that Atlantic people directly concerned with planning also are adapting — and sometimes inventing — newer, more efficient methods. Such is the case in planning shutdowns.

For many years, Atlantic has had a very sound system of planning shutdowns and has developed Engineered Planning Times for most phases of this work. About two years ago, however, it was decided to make selective use of the Critical Path Method in an effort to improve existing methods.

Briefly, this method is a scheduling technique in which an arrow is used to show each job in a project, thus forming a diagram. The tail of one arrow follows one or more arrows, showing which job, or jobs, must be completed before the next can go forward. The arrows are interconnected in this manner to show a sequence in which the jobs can be performed. The result is a graphical representation of the entire project, called an "Arrow Diagram."

In using the Critical Path Method, it was found that the additional discipline in development, which is essential, enabled the planners to plan the project more accurately, as well as to determine the earliest start and latest finish times for each job in the project. This, in turn, aided in ascertaining the elapsed time for the project.

They found, too, that by knowing the "Critical Path", or key jobs, they are able to man these jobs most effectively while non-critical, or "float" jobs, can be sequenced in a manner to provide the most advantageous leveling of manpower. Also, it helps follow the progress of each job and to determine when corrective action must be taken to bring the over-all project back into line.

Late in March, missile-like objects began appearing inside the North Yard fence along the Schuylkill Expressway. These are new Buell cyclones which will replace 24 worn ones in the #853 Unit regenerator. At the same time, most of the other internals of the regenerator will be replaced, making this one of the biggest shutdown jobs ever undertaken at the Philadelphia Refinery.

To plan this shutdown, for which the projected manpower requirements are 8,000 field mandays, Atlantic, for the first time, set up a Scheduling Management Display for the critical regenerator phase, using a procedure similar to the Critical Path Method.

First, the jobs in the project were listed, ignoring sequence and time, and each job was given an identification symbol. Next, a precedence matrix was set up, listing all jobs. Considering each job, individually, the question was asked, "What job — or jobs—immediately precedes this element?" On determining this, a check was placed in the appropriate block on the matrix. When all jobs had been considered, the sequence of operations was established.

The next step was to set up a Scheduling Management Display module in which each job was evaluated in elements of elapsed time. After determining a logical time scale, "gauges" were cut to proper length for each job and labeled. On completion, the precedence matrix and "fences" were used to relate jobs to each other and form a complete project display. All of this was done with a greatly reduced amount of paperwork and minimum of computations.

At this point, the project could be analyzed and the Critical Path determined from the module by inspection without need for computation.

When the module was completed, the initial projections indicated 92 shifts of work would be required. However, a five-man "brainstorming" group, in two meetings, again critically reviewed every job in the project to determine: Is this the minimum elapsed time? Is it in proper sequence? Is the best method being used? Is more overlapping of activities possible?

As the result of these two meetings, the total expected work time was reduced to 85 shifts, seven less than the earlier projection — a significant reduction in a unit of the importance of #853!

Planning, Cooperation, Effort Help Beat Shutdown Target

In the April issue of *To The Point*, we reported on the advance planning phase of the #853 Catalytic Cracking Unit shutdown which was then about to get underway. Now that this shutdown is history, all that remains to the story is to report on how well the planning paid off.

You may recall that there was a major modification job done on the unit during the shutdown. This included the complete replacement of all 24 Buell cyclones, the plenum chamber, air ring, etc.

Since this represented an unusually complicated and unique piece of work, it was given the full preparatory treatment; which included for the first time on a major project at the Philadelphia Refinery, the use of a Scheduling Management Display — an improved form of Critical Path Scheduling. The result of this planning was a projected target of 85 shifts to complete the job.

Actually, the time required to complete the work was just under 84 shifts, which is mighty close to the target — and on the right side.

It took the complete cooperation of many departments, sections, and, most of all, individuals to finish the job ahead of target. And, even the weather proved favorable to the entire operation.

The end result, to quote C. W. Stose, plant manager, was "a job very well done."

At Turnaround Time, Refiners Bring 'Pathfinder' into Play

PAULSBORO, N. J. — In a small wooden building near the alkylation unit at the Mobil refinery here last month, maintenance people spent hours moving plastic blocks along aluminum tracks on a giant plywood board.

By so doing, they knew, they could save hundreds of dollars in the impending turnaround of the unit.

The big board is called a Scheduling Management Display. It's the latest development in the new, sophisticated planning technique called Critical Path Scheduling, which has been used increasingly by Socony Mobil in construction and maintenance operations around the world.

Socony Mobil's Engineering Department pioneered in the use of Critical Path Scheduling. Recently, it was used to help the company complete the Mobil Repair Center in Camden, N. J., ahead of schedule.

In manufacturing, Critical Path Scheduling has been a great money-saver in planning turnarounds — the repair and maintenance of large units that operate 24 hours a day. A fast turnaround is vital to refiners because the flow of product is shut off until the job is completed.

Which Jobs Critical?

Basically, Critical Path Scheduling is a formalized method to determine the best possible work schedule. It helps determine which of the hundreds of jobs involved in the operations are "critical," which ones can be done concurrently, which delayed — and for how long. Thus it establishes the minimum time required to complete a given series of jobs, taking into account available manpower and general economic factors.

Until the advent of the SMD board, the information was first put into the form of an "arrow diagram."

Computers were then used to shorten the mathematical work that went into determining the "critical path."

With SMD boards, the planning is somewhat simplified, and computers are not needed. Mobil has ordered boards for each of its 11 refineries in the United States.

On the SMD board at Paulsboro last month, each of the plastic blocks represented one of the 300 jobs connected with the alkylation unit turnaround — an 11,000-man-hour operation.

"We can solve problems physically on the board, actually trying out solutions to see how they would work," explained Stu W. Thomson, refinery manager.

"We know we can save money. In a recent turnaround of a tube still here, we saved about 2,200 man-hours and some $1,250 in materials costs by using Critical Path Scheduling. It also promotes safety every step of the way by improving communications."

And at the big refinery at Beaumont, Tex., Mobil people recently saved several thousand man-hours and reduced downtime by eight days when they used SMD in the turnaround of a Thermofor Catalytic Cracking unit.

Manufacturing people are also using the method for startups and shutdowns and other major jobs.

Critical Path Scheduling is about two years old. It grew out of the U. S. Navy planning system called PERT (Program Evaluation and Review Technique). PERT was credited with the development of the Polaris missile a full two years ahead of schedule.

Adapted for Industry

The technique was then adapted for industry by Du Pont, taking into consideration such economic factors as "manpower balance," the cost of downtime, the relative merits of overtime pay vs. bringing in contractors for certain jobs.

Socony Mobil was one of the first oil companies to try the Du Pont method. It has since been taken up throughout the oil industry and is a favorite subject of engineering and technical journals.

The SMD refinement was perfected in the past few months by Management Studies, Inc., a Philadelphia firm. Again, Mobil was one of the first companies to try the new technique — and save time and money with it.

Drug News Weekly®

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Network Plan Advocated As Aid in Birth of Drug

By JOE McLEAN

PHILADELPHIA (FNS). — Drug manufacturers can save up to one-third of the time and money necessary to bring new drugs to market merely by adopting useful network planning schemes, a leading clinical pharmacologist said here.

Dr. John H. Nodine, head of the section of clinical pharmacology of the Hahnemann Medical College and Hospital, described network planning of some 20 representatives of drug companies during a one-day seminar entitled "The Birth of a Drug," held here.

He explained the various known methods of program, personnel and financial management which are based on a variation of what is known as the critical path method of scheduling the development and eventual manufacture of a product.

This "variation" was represented by a recently developed mechanical device called a Planalog, a name coined from the two words planning and analog.

Developed by Planalog, Inc., Philadelphia, the device, a patented idea, is a simple means for showing a busy planning executive exactly how his project is going.

Basically, the device consists of three separate parts: A desk-size aluminum frame with parallel grooves, plastic inserts that slide along the grooves, and vertical metallic pieces called fences, symbolizing the completion of important phases in a project.

The plastic inserts come in varying lengths and are analogies of the length of time needed to complete a task necessary to completing the phase. In similar systems, tasks are called activities, which lead up to completion of events, or phases in a project.

As set up, one or more of the plastic pieces representing tasks are inserted at the starting point of the parallel grooves of the frame. The metal fences, symbolizing the completion of a group of tasks, are placed perpendicular to the task pieces, the last metal fence at the end of the frame representing the completion of the total project.

These then become a dynamic, flexible, three-dimensional analog of a planning network drawing, visually combining features of such drawings (e.g., bar graphs and the so-called Program Evaluation Review Technique charts).

PLANNING: Every step in the development of a new drug can be mapped via a new device called a 'Planalog', shown being held by Joseph Platt (seated) of Philadelphia's Hahnemann Medical College. Dr. John H. Nodine (standing), head of the school's pharmacology dept, uses the planning device and a computer in his work on drug development and testing. The new device was invented by the Planalog Co of Philadelphia.

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